Appendix C

Understanding the Sediment Model

Sediment is the pollutant of concern on the majority of the water quality limited streams of the Panhandle Region. Any attempt to model the sediment output of watersheds will provide, relative rather than exact, sediment yields. The model used in this sub-basin assessment attempts to identify the primary sources of stream sedimentation in a watershed. This identification of primary sources will be useful in the design of implementation plans. If additional investigation indicates sources quantified require refinement, the model input can be altered to incorporate this new information.

The model looks at five general land uses: Pasture, Forest Land, Unstocked Forest, Highway and Double Fires. Pasture land includes hay fields, grazing pastures and any low elevation treeless land. Unstocked Forest includes natural openings and 90-100% cut-over forest. Highways are paved and contribute less sediment than a gravel road and, therefore, have a lower sedimentation rate. Double Fires areareas burned by two large wildfires. Acreages for each of these land uses are shown on the "Land Use" page of the spreadsheet.

Below the "Land Use" information is the "Road Data" section. It divides roads into those used in association with the harvesting of forest tree species, and unpaved county and unpaved private roads. Road data did not separate private and county roads so they were combined even though they may have different sediment yields. This section also includes an estimate of the cubic yards of sediment delivered to the stream due to slope failures along forest and county/private roads. This data was obtained from field work done for the Cumulative Watershed Effects Analysis, a tool developed by the Idaho Department of Lands to address the cumulative effects of multiple forest practices. Because no data were available for private and county road failures, a weighted average of the forest road failures were used.

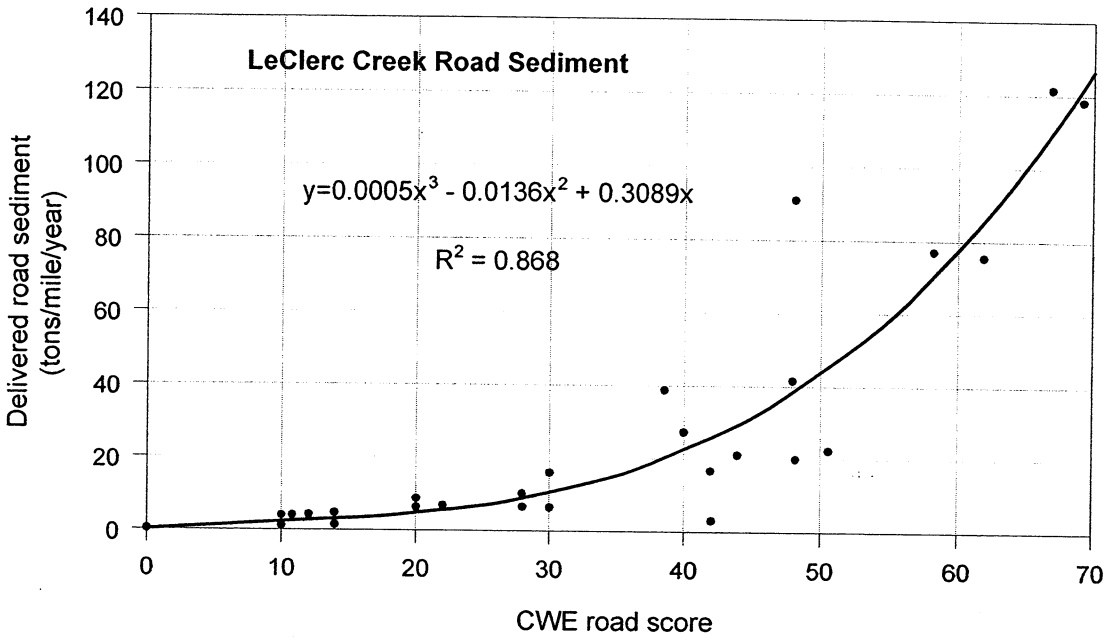
Stream bank erosion was estimated from aerial photos and on-the-ground spot checks. Better data may be available in the future and can be substituted for this estimate. The erosion coefficient for bank erosion was taken from a study by Stevenson in the Cocolalla Lake area. The calculation to obtain the bank erosion rates in tons/yr/mi is displayed in a footnote. It assumes a two foot high eroding bank and a soil weight of 90 pounds per cubic foot.

The "Sediment Yield" page of the spreadsheet shows the acreage from the previous page multiplied by the sediment yield coefficient. The basic land use coefficients were developed by using the WATSED and RUSLE models, which utilize localized information concerning landtype, acreage and other factors. The coefficients for "double fires" and "unstocked forest" were developed by taking the difference between the highest value of the coefficient for the

geologic type and the median. This value, 0.017 tons/acre/year of sediment, is added to the natural background sediment yield value of 0.038 tons/ac/yr.

The sediment yield from roads is calculated by using the McGreer Model formula that equates the Cumulative Watershed Effects road scores with a corresponding sediment yield (Figure 1). In the case of roads, it was assumed that all sediment was delivered to the stream system. These are conservative estimates of actual delivery.

Figure 1: Sediment export of roads based on Cumulative Watershed Effects scores.



The "Sediment Total" spreadsheet simply totals all the sources of sediment to come up with the existing sediment load. Natural background mass failures are also calculated from data collected by the Cumulative Watershed Effects teams. Natural background for each land use historically present in the watershed is then calculated on the last page of the spreadsheet. This number becomes the target load, the difference between the target load and the existing load is the amount of reduction that may be necessary to recover beneficial uses lost due to excess sedimentation.